CLAIMS

1. A method of displaying a holographically generated video image comprising plural video frames, the method comprising providing for each frame period a respective sequential plurality of holograms and displaying the holograms of the plural video frames for viewing the replay field thereof, whereby the noise variance of each frame is perceived as attenuated by averaging across said plurality of holograms.

2. A method according to claim 1, wherein the providing step comprises generating each hologram by implementing an algorithm having a single computationally intensive step.

3. A method according to claim 2, wherein the single step is a Fourier transform step.

4. A method according to claim 3, wherein the algorithm is arranged, for each said plurality of pixellated holograms, to:-

a) form first data having amplitude equal to the amplitude of the desired pixel;

b) inverse Fourier transform the first data to provide second data;

c) shift the second data in the real direction in the complex plane sufficiently to form a third data set in which the phase of each data point is small;

d) form as a fourth data set the magnitude of the third data set; and

e) binarise the fourth data set to form a fifth data set for display as a said hologram.

5. A method according to claim 4 wherein the step of binarisation comprises thresholding about the median of the fourth data set whereby the fifth data set has dc balance and low reconstruction error

6. A method according to claim 4 or 5, wherein the display device comprises a spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, wherein the algorithm is arranged to generate a four-phase hologram, wherein each pixel has one of the values $[1,j,-1,-j]$

7. A method according to claim 6, wherein the pixel values of the phase mask are spatially random.

8. A method according to claim 7, wherein step b) comprises inverse Fourier transforming and applying the phase mask values to the first data to provide the second data.

9. A method according to any preceding claim wherein the image is a 2 dimensional image.

10. A method according to claim 3 or any claim dependent upon claim 3, further comprising forming both the real and imaginary parts of the inverse Fourier transformed first data to form two second data sets, whereby two holograms are created per Fourier transform step.

11. Apparatus constructed and arranged to display a holographically generated video image having plural video frames, the apparatus having processing means arranged to provide for each frame period a respective sequential plurality of holograms and a display device arranged to receive the sequential plurality of holograms of each frame and to display the holograms of the plural video frames of the video image for viewing the replay field thereof, whereby the noise variance of each frame is perceived as attenuated by averaging across said plurality of holograms.

12. Apparatus according to claim 11 wherein the processing means is arranged to generate each said hologram by implementing an algorithm having a single computationally intensive step.

13. Apparatus according to claim 12, wherein the single step is a Fourier transform step.

14. Apparatus according to claim 12, wherein the algorithm is arranged, for each said plurality of pixellated holograms, to:-

a) form first data having amplitude equal to the amplitude of the desired pixel;

b) inverse Fourier transform the first data to provide second data;

c) shift the second data in the real direction in the complex plane sufficiently to form a third data set in which the phase of each data point is small;

d) form as a fourth data set the magnitude of the third data set; and

e) binarise the fourth data set to form a fifth data set for display as a said hologram.

15. Apparatus according to claim 14, wherein the step of binarisation comprises thresholding about the median of the fourth data set whereby the fifth data set has dc balance and low reconstruction error.

16. Apparatus according to claim 11,12 or 13, wherein the display device comprises a spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, wherein the algorithm is arranged to generate a four-phase hologram, wherein each pixel has one of the values $[1,j,-1,-j]$.

17. Apparatus according to claim 16, wherein the pixel values of the phase mask are spatially random.

18. Apparatus according to claim 17, wherein step b) comprises inverse Fourier transforming and applying the phase mask values to the first data to provide the second data.

19. Apparatus according to claim 14 or any claim dependent upon claim 14, further comprising forming both the real and imaginary parts of the inverse Fourier transformed first data to form two second data sets, whereby two holograms are created per Fourier transform step.

20. A method of generating pixellated holograms, the method comprising

forming a first data set, the members of said first data set having respective amplitudes equal to the amplitudes of respective desired pixels;

performing an inverse Fourier transform on the first data set to provide second data set;

shifting the second data set in the real direction in the complex plane sufficiently to form a third data set in which the phase of each data point is small;

forming as a fourth data set the magnitude of the third data set; and

binarising the fourth data set to form a fifth data set for display as a said hologram.

21. A method according to claim 20 wherein the step of binarisation comprises thresholding about the median of the fourth data set whereby the fifth data set has dc balance and low reconstruction error.

22. A method according to claim 20 or 21, wherein the display device comprises a spatial light modulator having a pixellated phase mask imposing phase shifts of 0 and $\pi/2$, wherein the algorithm is arranged to generate a four-phase hologram, wherein each pixel has one of the values $[1,j,-1,-j]$.

23. A method according to claim 20, wherein the pixel values of the phase mask are spatially random.

24. A method according to claim 20 or 21, further comprising applying the phase mask values to the first data to provide the second data.

25. A method according to any of claims 20-24, wherein the image is a 2 dimensional image.

26. A method according to any of claims 20-25, further comprising forming both the real and imaginary parts of the inverse Fourier transformed first data to form two second data sets, whereby two holograms are created per Fourier transform step.